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Chronic calcific pancreatitis: Clinical profile in northern India

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Summary: Twenty three patients with chronic calcific pancreatitis of the tropics in Northern India were prospectively studied. All had pancreatic calcification and ERCP changes typical of chronic pancreatitis, the most predominant being ductal dilatation which was detected in all patients by both ERCP and by ultrasonography. Pain was present in 19 (83%) patients and diabetes in 11 (48%) patients. Exocrine pancreatic dysfunction was uncommon, steatorrhoea being present in only 9% of patients. Ten of the 11 patients with diabetes required insulin for control and one case was able to be controlled by an oral antidiabetic agent. Two patients developed ketoacidosis during acute episodes of pancreatitis, 3 patients had peripheral neuropathy and one patient had visual changes.

Recurrent severe pain was the reason for operation in 7 patients. All had a lateral pancreaticojejunostomy. In order to obtain an objective assessment of pain, a scoring system was developed to grade its severity according to its intensity, frequency and consequences. Six patients who preoperatively had a pain score of 15 or more (out of a maximum score of 24) attained significant relief after the surgery. We feel this scoring system may provide an easy objective assessment of pain in the subsequent follow-up of these patients. *Gastroenterol Jpn 1988;23:195–200*

Key Words: *Chronic pancreatitis, ERCP, Lundh meal test, Northern India, Pancreatic calcification*

Introduction

Chronic calcific pancreatitis of the tropics (CCPT) is characterised by pancreatic calcification, abdominal pain and diabetes starting in early childhood or adolescence. It was first reported from Indonesia[1] but has been subsequently found to occur in many other countries including Uganda[2], Sri Lanka[3], Zaire[4] and India[5-7]. In India the cases have been mainly reported in Kerala but have been increasingly noted in other parts of the country also, e.g. Madras[6,8], Hyderabad[9], Karnataka[10], Orissa[11] and Northern India[12,13]. In order to assess the frequency of occurrence of CCPT in our region and to compare its clinical features, with those observed in CCPT patients from Kerala, we initiated a prospective study at the All India Institute of Medical Sciences in New Delhi in the beginning of last year.

Materials and Methods

During the past 18 months we have prospectively studied 23 patients with CCPT from the Gastroenterology and Gastrointestinal surgery clinics of this institute. They all had pancreatic calcification on plain abdominal radiographs and this calcification was graded as I, II and III depending on whether it was present only in the head of the pancreas (Grade I), in the head and body of the pancreas (Grade II) or throughout the pancreas (Grade III). None of the patients had a history of alcoholism; nor did

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they have any biliary tract disease.

Their pain characteristics and other clinical features, as well as their dietary habits and socioeconomic backgrounds, were assessed. A scoring system was used to grade the pain. Its intensity (I), frequency (F) and consequences (C) were assessed at every visit to determine a "pain score".

Intensity (I) was given a score of 0 to 8 on the following scale:

No pain I_0

Insignificant pain (only on direct questioning) I_2

Mild pain I_4

Moderate pain (analgesics regularly required but no drug dependency) I_6

Severe pain (Drug dependency present and sleep disturbed regularly) I_8

Frequency (F) and consequences (C) were also assigned maximum scores of 8 each, but the latter were made up of 4 scores of two different subcategories. Thus, the 8 scores of F were made up by 4 scores of pain episodes/year and 4 of duration/year as shown below. Similarly, C was assessed by two different parameters, each comprising a maximum score of 4.

Scores	0	1	2	3	4
(F) **Frequency**					
of pain episodes/year	3	4–6	7–9	10–12	12
duration in hrs/episode	<12	12–24	24–48	48–78	72
(C) **Consequence**					
Work loss in months/year	0	1	2–4	5–8	8
No. of hospitalizations/year	0	4	5–8	9–12	12

The maximum score possible of I, F and C together was thus 24. Depending on the sum of the three sets of scores (I, F and C) for an individual patient, he or she was categorized as having mild (scores 1–8), moderate (scores 9–14) or severe (scores 15–24) pain.

Every patient had a thorough physical examination including measurement of weight and height to calculate the body mass index (weight in kg/height in metres[2,14]. Investigations included routine blood chemistry, ultrasonography, a plain film of the abdomen, endoscopic retrograde cholangiopancreatography (ERCP), 24-hr. fecal fat estimation, a Lundh meal test and an oral glucose tolerance test.

The patients were subjected to surgery only when their pain was intractable i.e. not responding to mild analgesics and when it interfered with their daily activities. Postoperative assessment of their clinical and biochemical features was done every 3 months.

Results

The age of the patients ranged from 16 to 48 years (mean ± SD; 31.9 ± 8.5 years). Eighteen patients were male and five female. All but two were from Northern India and had lived in this region for most of their lives. Their dietary habits were variable but no one gave a history of regular consumption of tapioca or any other special item of food.

Pain was their most dominant symptom, being present in 19 (83%) patients. The duration of pain ranged from 2 to 30 years. Twelve patients had noticed a progressive increase in the intensity of pain over the years while in five patients it had remained the same. In two other patients there had been a decrease in pain intensity over the last 2 years.

The site of pain was mainly epigastric. However, in three patients it was maximal in the right upper quadrant of the abdomen and in 13 patients it radiated to the back. According to the scoring system described above, 7 (30%) patients had mild pain, 2 (8%) had moderate pain and 10 (43%) patients had severe pain. The remaining 4 (17%) had no pain whatsoever.

Diabetes was present in 11 (48%) patients. Their mean fasting blood glucose was 168 ± 51 mg% and the 90 min. post meal blood glucose 255 ± 79 mg%. Ten patients required insulin for control (average requirement 43 u/day) while one patient was controlled on a daily tablet of glibenclamide. Two patients developed ketoacidosis during severe episodes of pancreatitis but recovered completely. Three

Table 1 CCPT: Severity of pain in relation to pancreatic calcification and duration of disease

Pain grade (No.)	Calcification grade (No.)			Duration (years)
	I	II	III	
No pain 4	1	2	1	5.5
Mild 7	3	2	2	14
Moderate 2	2	–	–	4
Severe 10	3	4	3	6.7

patients had peripheral neuropathy (25%) and one patient (9%) had visual changes.

The blood chemistry was essentially normal in all the patients, and the serum amylase remained below 200 Somogyi units/dℓ even during an episode of pain. The mean total serum protein was 7.3 ± 0.4 G/dℓ and albumin 4.2 ± 0.6 G/dℓ.

Two patients had steatorrhoea (fecal fat 10.2 and 9.7 G. per 24 hours); one of them was a diabetic and did not have "pancreatic" pain[1]. The Lundh meal test was performed in 7 patients only. Three showed a low bicarbonate concentration and 4 low bicarbonate as well as tryptic activity. However, the fecal fat excretion was normal in all these 7 patients.

There was no correlation between the severity of pain or the grades of calcification and the exocrine or endocrine insufficiency of the pancreas. Nor was there any correlation between the severity of pain or calcification and the duration of disease (**Table 1**). Four patients who had varying degrees of calcification-2 of grade II and one each of grade I and grade III had no pain whatsoever. Two of them had diabetes for 10 years and the other two for less than one year. Similarly, of the 10 patients with severe symptoms, 3 had grade I, 4 had grade II and 3 had grade III calcification. Six of these had symptoms for less than 5 years while the remaining 4 had symptoms for 9–16 years, the average duration being 6.7 years. The duration of disease was much shorter in patients with severe pain than in those with mild pain (mean 14 years).

The ERCP and ultrasonography findings are summarized in **Table 2**. According to the

Table 2 Ultrasound and ERCP findings in chronic pancreatitis patients with calcification

Abnormality	Ultrasound (23)		ERCP (21)	
	No.	%	No.	%
Ductal dilatation	23	100	21	100
Detection of calculi	23	100	21	100
MPD dilatation on US; block by ERCP	5	21.7	5	23.8
US & ERCP both show blockage of MPD	3	13.1	3	14.3
Pseudocyst	1	4.3	1	5.0

Numbers in parentheses indicate the number of patients studied.
US = ultrasound examination.
MPD = main pancreatic duct.

criteria adopted at the 1984 International Workshop in Cambridge[15] all the patients had ERCP changes of severe pancreatitis, i.e. they all had dilatation of the main pancreatic duct. In addition 8 patients had partial or complete obstruction of the main duct and one patient had a pseudopancreatic cyst. The same information was however, also obtained from ultrasonography in all our patients. Representative findings of ERCP and ultrasonography are given in **Figures 1 and 2** respectively. Five patients, who on ultrasound examination had a demonstrable pancreatic duct dilatation, had in addition a block in the duct demonstrated by ERCP.

Seven patients underwent operation. Six of them had very severe pain and had pain scores above 15. All underwent lateral pancreaticojejunostomies and they all experienced pain relief (**Table 3**). Three patients have been followed up for one year. One has had a decrease in pain score from 16 to 5, another from 22 to 2 and one from 15 to 2. The other 3 patients have had a much shorter follow up (3 months), but during this period they have remained pain-free, and have not required any analgesics.

The seventh patient who underwent surgery had moderate but recurrent pain preoperatively (score 11) and did not have much dilatation of the pancreatic duct (confirmed at operation). After distal pancreatectomy he had a stormy

Table 3 The effect of surgery on pain, activity, analgesic intake and diabetes in CCPT patients

Case No.	Pain score			Analgesics		Comments
	Pre-op.	Post-op.	%-age improvement	Pre-op. Inj./ Episode	Post-op.	
1.	16	5	75	4–5	Occasional	Can do his job which he was not able to do before surgery
2.*	22	2	90	6–7	No tablets or injection	Can do his job
3.	15	2	90	6–7	No drug	Can attend classes and concentrate on studies
4.	18	No pain	90	5–6	No drug	Attending college
5.	23	No pain	90	4–5	No drug	Ambulatory and working
6.	17	No pain	90	3–4	No drug	Working
7.	11	died	died	–	–	–

* Insulin requirement/day: Pre-operative – 70 units;
Immediate post-operative 10 days – No insulin;
Up to 6 months post-operative – 94 units;
6–12 months post-operative – 32 units.

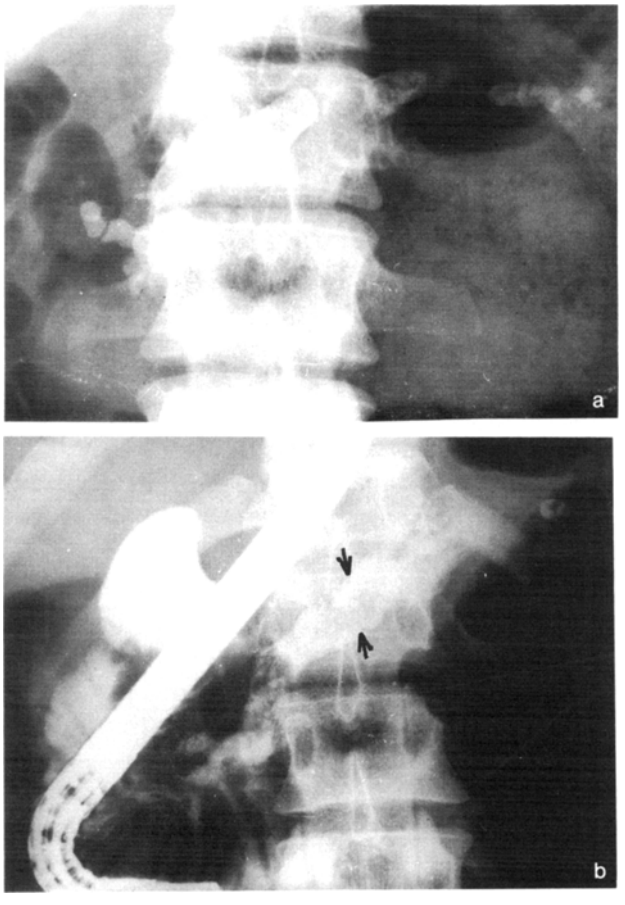

Fig. 1 Plain film of the abdomen (a) and ERCP (b) of a CCPT patient showing Grade III pancreatic calcification and greatly dilated main pancreatic duct (outlined by arrows).

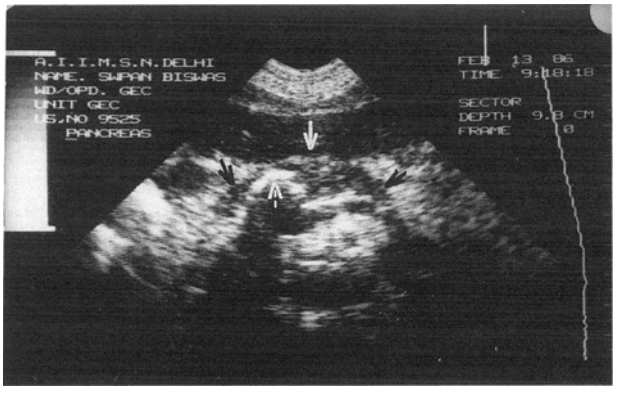

Fig. 2 Transverse ultrasound scan showing markedly dilated main pancreatic duct (arrows on the outer border) with echogenic nodules and acoustic shadowing seen in the head and proximal part of the body of the pancreas (dotted arrow).

post-operative course and died 1 month after the procedure.

Discussion

An increasing number of patients with CCPT are being reported from Northern India[12,13]. In the present study conducted in New Delhi, 23 patients were seen over 1-1/2 years. Their age and sex distribution were similar to those of patients reported from South India[5,8] and elsewhere[11,15].

Pain was the most frequent symptom in our

patients (83%) as in others[5,13,16], but it bore no relation to the degree of calcification or the extent of pancreatic dysfunction.

Diabetes was the next most common presentation, affecting 43% of the patients. The incidences reported in other series varied between 50%[7] and 100%[13]. The lower incidence in our patients may be due to the fact that most of the patients reporting to gastroenterology service were referred for abdominal pain; in contrast, endocrinologists see patients presenting mainly with diabetes.

The major complications of diabetes seen were peripheral neuropathy and diabetic ketoacidosis. Most of the cases of diabetes reported from South India have had ketosis-resistant diabetes[5,7], although Mohan et al.[17] from Madras have reported that 18% of their patients had developed ketoacidosis.

They also observed that 33% of the patients responded to oral anti-diabetics, a phenomenon virtually never seen in Kerala[5,7]. One of our patients was also well controlled on oral glibenclamide.

The patients reported from Kerala had a characteristic parotid enlargement and cyanotic lips[6,7]. None of our patients had these signs.

The fecal fat excretion was increased in only 9% of our patients, in contrast to the reported figures of 70–90% from South India[18,19]. As expected, no intestinal dysfunction was observed and all the patients had a normal D-xylose test. George et al. [18] observed that their patients had exocrine abnormalities in the form of low bicarbonate, low trypsin and lipase, but normal amylase levels. Similarly, in the present study, the Lundh meal test performed in 7 patients showed that both bicarbonate concentration and tryptic activities were low in 4 patients and the bicarbonate concentration alone was low in 3 patients.

No comment can be made from our study regarding the etiology of CCPT except that no special food could be identified as having been regularly consumed by our patients and only 3 out of 23 (14%) patients appeared overtly undernourished (BMI<15 kilogram/metre^2), thus excluding tapioca as a pancreatic toxin and malnutrition as an etiological factor in our cases of CCPT. The possibility of other unidentified toxins however, obviously cannot be ruled out[15].

No correlation could be established between the grades of calcification and the severity of pain or the endocrine/exocrine dysfunction of the pancreas. Lankisch et al.[20] also failed to establish a correlation between the grade of calcification and the endocrine/exocrine abnormalities in alcoholic chronic pancreatitis.

ERCP and ultrasonography demonstrated that all our patients had severe chronic pancreatitis with marked ductal changes. It is perhaps because the changes were severe that the ultrasound examination was so accurate. Indeed it was the only method of delineating the pancreatic ductal dilatation beyond the obstruction in five patients, in whom the ERCP revealed a block in the proximal part of the MPD.

The results of decompressive surgery in our limited series have been gratifying. Six of the seven patients operated on for severe pain had marked relief and returned to work. Furthermore, one patient with diabetes was stabilised on a smaller dose of insulin than needed before the operation. Although several surgical procedures have been suggested for CCPT the most effective of them seems to be lateral pancreatico-jejunostomy[16,21-24]. We have had fairly gratifying results with this operation—6 out of 7 patients experiencing significant pain relief. Bhansali et al.[24] in addition noted an improvement in the diabetic status of 2 of their patients. Even patients with chronic alcoholic pancreatitis who have predominantly ductal obstructive features have been recently observed to show an improvement in steatorrhoea following decompressive pancreatic surgery[25].

The fact that all the six patients who did well following surgery had a pain score above 15 would support the usefulness of the scoring system suggested. The bad outcome in the only patient operated upon with a score of 11 may indicate that in a patient with a pain score of

less than 15 medical treatment should be continued and that only when it is above 15 should surgery be considered. The scoring system may also serve as an objective method for assessing post-operative pain relief. The validity of these initial impressions will, however, have to be tested prospectively in a larger number of patients. Similarly, the effect of surgery on pancreatic functional abnormalities in the long term will require the study of more patients followed up over a longer period of time.

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